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AN
INAUGURAL ESSAY

ON THE
Effects of Cold upon the Human Body.

Submitted to the Examination of the

REV. JOHN EWING, S.T.P. PROVOST,
THE MEDICAL PROFESSORS AND TRUSTEES,
OF THE
UNIVERSITY OF PENNSYLVANIA,
FOR THE DEGREE OF DOCTOR OF MEDICINE,

On the 12th Day of May, 1797.

BY

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Of Gloucestershire, England;

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OF EDINBURGH.

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With crest of gold, should sultry Sirius glare,
 And with his kindling tresses scorch the air ;—
Nymphs! on light pinion lead your banner'd hosts
 High o'er the cliffs of Orkney's gulphy coasts ;
 To where in azure coif and starry stole,
 Grey *Twilight* sits, and rules the slumbering Pole.
 There *Nymphs!* alight, array your dazzling powers,
 With sudden march alarm the torpid hours ;
 On ice-built isles expand a thousand sails,
 Hinge the strong helms, and catch the frozen gales ;
 The winged rocks to feverish climates guide,
 Where fainting zephyrs pant upon the tide :
 While swarthy nations crowd the sultry coast,
 Drink the fresh breeze, and hail the floating frost,
Nymphs! veil'd in mist the melting treasures steer,
 And cool with arctic snows the tropic year.

BOTANIC GARDEN, Canto 1st.



TO
Benjamin Rush, M.D.

PROFESSOR OF THE INSTITUTES, AND OF
CLINICAL MEDICINE,

IN THE
UNIVERSITY OF PENNSYLVANIA.

SIR,

I was too conscious of the numerous defects of this probationary Essay, to request your permission to dedicate it to you; yet, at the same time, was too sensible of the advantage of placing it under your protection, to forego that distinction: hence, without solicitation, I have taken a liberty, which your known benevolence will lead you to excuse, although your judgment should condemn the imperfect composition, for which your patronage is requested. Another, and a still more powerful motive, concurred to influence me
in

in taking this step. Feeling, as I do, the connection which has existed between us for some time past, both as an honor, and a privilege, I could not forbear making use of this public opportunity, of expressing my gratitude for the benefit which I have derived from your instructions, both as your private Pupil, and as an attendant upon your public Lectures. With the most sincere wishes, that your valuable life may be preserved for the advancement of Medical Science, and that your exertions to alleviate the evils of humanity, may be crowned with continued and encreasing success,

I remain, Sir,

Your grateful and affectionate Pupil,

JOHN EDMONDS STOCK.

Philadelphia,
May 2d, 1797.

AN

INAUGURAL ESSAY, &c.

IN submitting the following Essay, to the inspection of the Trustees and Faculty of the University of Pennsylvania, as a necessary step for obtaining a medical degree, I cannot forbear following the example of many of my predecessors, in soliciting indulgence for the imperfect performance of a task imposed by necessity, and undertaken with much anxiety and apprehension.

The variety of pursuits which necessarily occupies the mind of the Medical Student, must in general prevent him from paying such exclusive attention to any single subject, as will enable him to elucidate what was before obscure, or to throw many new lights upon what was already known. In general, therefore, he must content himself with the more humble office of arranging the observations and experience of others, in such a manner, that the praise of industry may be granted him, although that of invention or originality be denied. Whilst

so many sages and philosophers, have consumed a long and laborious life in exploring the recesses of the temple of Medical Science, new discoveries can scarcely be expected from him, who, with trembling and uncertain steps, is yet lingering on the threshold.

An Inquiry into the Effects of Cold upon the Human Body, naturally divides itself into two parts. The first, should comprise the principal facts of its operation upon the system in a healthy state; the second, should apply the facts thus collected, in order to regulate the use of it as a remedy in a morbid state.

Under the first head it may be necessary to inquire, what point in the temperature of the atmosphere, produces the sensation of cold, when applied to the human body. The 60th degree of Fahrenheit may perhaps be assumed as a standard, since various writers have observed, that in temperate climates, the body constantly retains its natural heat in a man of middle age, when the thermometer stands at 62 degrees.* A temperature inferior to this, gradually abstracts the sensible heat of the body. Although this definition be general, it is perhaps sufficiently accurate for the present purpose.

When the body is exposed for a time to any degree of temperature inferior to the point above-mentioned, one of its most evident effects is a weakened action of the heart and arteries. This is more particularly obvious when the cold applied, be either violent in its degree or long in its duration. Various experiments prove this fact. In cold countries the pulse is uniformly slow. In Greenland it seldom beats above forty strokes in a minute. Of the effects of cold water in weakening the

* Cullen's First Lines, Sect. 88, *Dissertatio Inauguralis de Frigore*, Edinburgi 1780.

the pulse, a decisive experiment is recorded by Dr. Rush in his Account of the Yellow Fever of 1793.* "In an experiment," says he, "which was made at my request by one of my pupils, by placing his feet in cold pump-water for a few minutes, the pulse was reduced 24 strokes in a minute, and became so weak as hardly to be perceptible."

Experiments upon the effects of cold water upon the pulse, have been also made by Dr. Marcard, first physician to the Duke of Holstein, with results precisely similar. After it had been applied for about four minutes, he observes that the pulsations were uniformly much diminished, both in force and frequency. This gentleman has written a German treatise upon the Medical Effects of Bathing in general. From this performance, by the kindness of a literary friend, I was furnished with the above fact. I lament that my ignorance of the language in which it is written, should have precluded me from the perusal of a work which appeared to contain many observations highly valuable and interesting.

Another general effect of cold, is a paleness of the skin, produced by the contraction of the superficial vessels, and the suppression of perspiration. This is called by Dr. Cullen its astringent quality.† This paleness is of short duration, being soon succeeded by an increased redness, the blood having now rushed into the vessels and formed congestion. From this effect, cold has been supposed to be a stimulus. But although it may in some instances appear to be possessed of a stimulating power, I shall endeavour hereafter to shew, that this is always of the indirect kind;

* Rush on the Yellow Fever, p. 288, 2d edition.

† First Lines, Sect. 90.

kind; this inquiry, however, may be properly postponed at present.

After this redness has continued for some time, if cold be still applied, the colour changes to a livid hue, and by a still longer application of it, gangrene is at length produced.

A third general effect of cold, is its power of encreasing the appetite for food. The absence of the invigorating influence of heat, renders the use of other stimuli more necessary for the preservation of animal life. Hence we are prompted by nature to take in a greater quantity of aliment, in order to supply the deficiency.

The union of cold with its other exciting causes seems essential to the production of Scurvy. That this is the case appears evident from the description of the disease given by Dr. Cullen in his Nosology.* To the account of its symptoms he prefixes the words "in regione frigidâ." It is also rendered probable by its comparatively rare appearance in warm climates and seasons, and from warm clothing having a considerable effect in preventing its attacks, or in moderating its violence.†

It may here be remarked, that various opinions have been formed, with regard to the favorable or unfavorable effects of cold upon the health of man. "It is thought by many," says the elegant author of the Botanic Garden, ‡ "that frosts are in general salubrious to mankind. The bills of mortality; however, in frosty seasons, are an evidence in the negative, as in long frosts many weakly and old people perish from debility occasioned by the cold." This idea has led the author in another part of the same work, to suggest a scheme for preventing

* Vide Synopsis, Vol. 2d, p. 291.

† First Lines, Vol. 4, Sect. 1797.

‡ Botanic Garden, Vol. 1st, Additional Note 12.

preventing or diminishing its injurious effects; the benevolence of which is more obvious than its practicability. " If," he observes, " the nations who inhabit this hemisphere of the globe, instead of destroying their seamen or exhausting their wealth in unnecessary wars, could be induced to unite their labours to navigate those immense masses of ice which encircle the North Pole, into the more southern oceans, two great advantages would result to mankind, the tropic countries would be much cooled by their solution, and our winters in this latitude would be rendered much milder, for perhaps a century or two, till the masses of ice became again enormous."*

Here however we should call to mind the scene in which these observations were made, since perhaps, many of the supposed insalubrious effects of cold, may rather be attributed to its frequent alternations with heat, in the variable climate of England. That this alternation is favorable to the production of diseases of the inflammatory kind, has been frequently observed. The venerable Sydenham long since remarked it, and his forcible expressions upon the subject, manifest the deep conviction which he entertained of its injurious power. He represents its destructive operation as superior to the combined effects of plague, famine, and the sword.† Whether cold, unless violent in its degree, produce consequences equally injurious in a steady and settled climate, appears rather doubtful. Dr. Rush informs us, in his lectures, that during the intense and regular cold of winter in Russia, inflammatory diseases are scarcely known. As the inhabitants of that country, expect no change of temperature during that season, their
clothing

* Botanic Garden, Vol. 1st, Canto 1st, Note on line 529.

† Wallis's Sydenham, Vol. 1st, p. 357.

clothing and habitations are carefully adapted to the rigour of the climate. But upon the arrival of Spring, they are exposed to fevers of a high degree of malignity.

Having been thus led insensibly to the consideration of some of the morbid effects of cold, it may here be remarked, that the best security against them, consists in the use of nourishing aliment and the application of warm clothing, particularly to the lower extremities. Attention to this last circumstance is particularly necessary in variable climates. A pernicious substitute for the article above-mentioned, in order to defend the body from injury from cold, has been sought for in the use of spirituous liquors. This delusive idea has been ably and successfully combated by Dr. Rush. He has shewn that the stimulus which they afford is transitory, that the temporary warmth which they produce is always succeeded by chilliness, and that they leave the system in a state more sensible to the impression of cold than before.*

Cold acts upon the body more powerfully in the sleeping than in the waking state. Hence a cold night succeeding a warm day in the month of August frequently produces sickness. The debility of cold is here aided by the inaction of sleep suddenly induced upon the system.†

The application of cold to the surface of the body causes, in a given time, an increased flow of urine. The fact will admit of important application under the second head of this Essay.

Cold, when combined with moisture, produces sensations much more distressing, and chills the body much faster, than dry cold, of a much lower temperature. This fact is thus accounted for by Dr.

* Rush's Inquiries, Vol. 2, page 67.

† Rush's Inquiries, Vol. 4, page 128.

Dr. Darwin. "In cold, moist days," he observes, "as we pass along, or the wind blows upon us, a new sheet of cold water is as it were perpetually applied to us and hangs upon our bodies; now as water is 800 times denser than air, and is a much better conductor of heat, we are starved with cold like those who go into a cold bath, both by the great number of particles in contact with the skin, and their greater facility of receiving our heat."*

A singular effect of cold is related by Bruce in his travels to discover the source of the Nile. Whilst he was sailing up that river, he observed that the chilling air of the night, constantly depressed the spirits and excited the terrors of the sailors who navigated the boat. If we admit the beautiful and elegant explanation of the phenomena of fear, given in the first volume of *Zoonomia*, this effect may be referred to the Laws of Association. The first application of cold at the moment of birth to the tender skin of the infant, produces those sensations which are ever afterwards connected with the apprehension of danger, and constitute its natural expression.†

Hitherto I have only attempted the history of the effects of moderate cold, but if our inquiries be extended to the consideration of greater degrees of it, we shall find them to be much more powerful and extensive. Of the mode by which a degree of heat capable of resisting these effects is generated in the human body, various theories have been proposed. A late writer ‡ remarks that "an habitual putrescent state of the human body, seems necessary in very cold climates, as it affords the natural and most effectual means of correcting their influence, and supporting the proper degree of heat necessary to life." To
prove

* Botanic Garden, Part 1st, Additional Note 12.

† Darwin's *Zoonomia*, Vol. 1st, Sect. xvi. 8. Sect. xxix. 4.

‡ Wilson on Climates, p. 186.

prove that this theory is visionary, we have only to consult the ingenious inaugural dissertation of Dr. Seybert, in which he has demonstrated the fallacy of the opinion, that the putrefactive process takes place in the living body. The explanation of this fact must be attempted therefore, in another way. That the oxygene received into the lungs in respiration, is the great support of animal heat, is now generally admitted. The air in these cold countries is highly condensed, and must consequently contain in a given quantity, a larger proportion of oxygene, and hence at each act of respiration, a proportionably greater quantity of caloric is disengaged.

In tracing the effects of great degrees of cold, their analogy to those produced by great degrees of heat must naturally excite our attention. Both produce relaxation of the vessels, gangrene, and other similar effects.* In Siberia the resemblance of the phenomena produced by causes so totally opposite is particularly observable, and in Nova Zembla cold produces blisters on the face and ears.† In the other regions of eternal frost, which lie under the same latitudes, metallic substances blister the skin, like red-hot iron.

This analogy might be pursued further. It might comprehend the debility produced by the excessive operation of either of these causes, which though different in its kind, produces effects very similar. It has even been extended by some writers to the faculties and operations of the mind. Dr. Ferguson, in his Essay on the History of Civil Society, observes, that, "Under the extremes of heat and cold, the active rage of the human soul appears to be limited, and men are of inferior importance either as friends or as enemies.

* Browne's Elements, Vol. 1st, p. 97.

† Boyle's Treatise on Cold.

mies. In the one extreme, they are dull and slow, moderate in their desires, regular and pacific in their manner of life; in the other, they are feverish in their passions, weak in their judgments, and addicted by temperament to animal pleasures; in both the spirit is prepared for servitude; in the one it is subdued by the fear of the future; in the other it is not roused, even by its sense of the present."

A similar remark is made by Dr. Wilson, in his observations upon the Effects of Climate, from which I have already inserted an extract. In speaking of the inhabitants of the Frigid Zone, after shewing their resemblance in form, colour, and various other particulars, to the natives of the Tropical countries, he concludes with observing, that they resemble them in indolence, stupidity and cowardice.*

This train of reasoning, our author pursues to a considerable extent in another part of the same work. He again introduces his theory of putrescency, and endeavours to prove, that the sloth and inactivity, which are equally characteristics of the inhabitants of the Tropical and Polar regions, proceed from a similar putrescent tendency in their bodies. Had he stopped here, the delusions of theory would not merit reprehension. But his errors cannot be contemplated with equal indulgence, when he declares that the extremes of cold and heat render a climate alike unfavorable to the growth or maintenance of public liberty; for humanity calls on us to condemn the opinion, that there exists either in the frozen regions of the Pole, or the burning sands of the Tropics, a physical necessity for the horrors of slavery.

Many of the effects of excessive degrees of cold, remain yet to be pointed out. When the

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* Wilson on Climate, p. 254.

French Academicians wintered at Tornea in Lapland, the external air, when suddenly admitted into their rooms, converted the moisture of the air into whirls of snow; their breasts seemed to be rent when they breathed it, and the contact of it was intolerable to their bodies.*

A similar instance of the effects produced by the reception of air so intensely cold into the lungs, is recorded by Boyle in his philosophical Treatise upon Cold. He gives it upon the authority of Dr. Fletcher, who, about the time of his publication, was ambassador from England to Russia. "I found," says the latter gentleman, "that when I came out of a warm room into the cold, I sensibly drew my breath stiff and even stifling with cold; so powerfully and suddenly does the intensely refrigerated air, work upon the organs of respiration."†

How far may the distressing sensations experienced upon the admission of this intensely cold air into the lungs, be referred to the large quantity of oxygen gas, which must necessarily be presented in a volume of air so much condensed?

This opinion is I think rendered probable by the phenomena of Pulmonary consumption. In its first stage it partakes strongly of the inflammatory diathesis. Hence Dr. Beddoes attributes the origin of this disease to the presence of too much oxygene in the system.‡ We find it occurring most frequently in cold climates, and in the winter season. May it not therefore be caused by the increased quantity of oxygene taken in at each respiration in cold weather, operating upon predisposing debility in the lungs? May not a still greater degree of oxygene contained in each volume of air, produce at each respiration sensations still more acute and distressing,

* Encyclopædia Britannica, Vol. 5.

† Boyle's Works abridged, Vol. 1, p. 655.

‡ Beddoes on Consumption.

distressing, till they at length arrive to the point above-mentioned? But to return to our subject..

Cold thus violent, when long applied, terminates fatally. Seven thousand Swedes are said to have perished at once, in attempting to pass the frozen mountains, which form the western barrier between that country and Norway.* Cold, however, much less intense in its degree, even though it be but a few degrees lower than the freezing point of Fahrenheit, if combined with the moisture produced by the solution of snow and hail, may prove equally fatal. The reason of this has already been explained. The evaporation which takes place, gradually carries off all the heat of the body, till there no longer remains a sufficient degree of it, for the support of animal life. In such cases, the person first feels himself exceedingly chill and uneasy, he gradually becomes unwilling to walk or use exercise to keep himself warm; and at last turns drowsy, sits down to refresh himself with sleep, and awakes no more.

The drowsiness produced by excessive cold, seems an universal effect, and was long ago remarked by Boyle, in that Treatise which I have already had occasion to quote. Under this head he inserts some extracts of a letter in which we find the following passage. "As to those who are killed with cold, they perish differently. For some not being sufficiently fortified against the cold by their own internal heat, nor competently armed against it by furs, inunctions, and other external means; after having their hands and feet first seized, till they grow past feeling it, the rest of their bodies is so invaded, that they are taken with a drowsiness that gives them an extreme propensity

* Encyclopædia Britannica, Vol. 5.

† Boyle on Cold.

propensity to sleep, which, if indulged, they awake no more, but die insensibly."

But a more recent instance of this effect of cold, is detailed in a manner peculiarly interesting, in Captain Cook's first Voyage. Whilst that intrepid navigator lay at anchor in the bay of Good Success in the Terra del Fuego, the excessive cold and mutability of weather in those southern regions, had nearly proved fatal, to some of the companions of his expedition. Dr. Solander, Mr. Banks, and some other gentlemen, with their attendants, set out on a summer's morning, in order to botanize. They ascended a mountain for this purpose, but were suddenly surprized by such storms of snow and hail, as rendered their return to the ship for that night, utterly impracticable. Dr. Solander had warned his companions of the drowsiness with which persons about to perish with cold were always affected, and had earnestly conjured them, upon no account to give way to it. It is remarkable, that notwithstanding this caution, he was himself the first who seemed likely to fall a victim. He was seized with a violent inclination to sleep, nor was it in the power of his companions to prevent him from sitting down for that purpose. He was however soon roused by their united exertions; but during the short space of a few minutes, his feet were so much diminished by the contraction of the muscles, that his shoes fell off, when he was compelled to rise, and it was not without difficulty that he was recovered. The morning proving favorable, they accomplished their return to the ship, but with the loss of two of their companions, who had perished from the severity of the cold.*

It is worthy of remark, that infants seem possess of a greater power of resisting the effects of these
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* Cook's first Voyage.

excessive degrees of cold, than adults. Of this fact an instance is related by Dr. Rush in his Lectures. He gives us the history of an Indian woman, who having been accidentally exposed without shelter to the inclemency of a wintry night, was found in the morning frozen to death, with an infant still alive at her side.

In many instances of this kind, however, life, though apparently suspended, may, if proper means be used, be restored. Although excitement be abstracted, excitability for some time remains, and till this also be extinguished, hopes of recovery may be entertained. But so much is the excitability with regard to the stimulus of heat accumulated, that it is necessary to apply it with great caution, and very gradually. The sudden application of it, has frequently proved fatal. Tissot observes, that "If heat be applied to a frozen part, the case proves irrecoverable. Intolerable pains are the consequence, which pains are speedily attended with an incurable gangrene, and there is no means left to save the patient's life, but by cutting off the gangrened limbs."* Of this he gives us a melancholy instance, in the case of an inhabitant of Cossanay, who had both his hands frozen. Some warm liniments were applied to them, the consequence of which was the necessity of cutting off six of his fingers.

To avoid these fatal consequences, the body should be immersed in cold spring-water, it may even be necessary to render it colder, by putting in a little snow or ice. This addition is recommended by the author just quoted; of its propriety I confess myself rather dubious. This moderate encrease of temperature will be sufficiently stimulating to a body which has been long exposed to
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* Advice to the People, p. 458.

an intense degree of cold, and as life and motion gradually return, greater degrees of comparative heat may be applied, till the body return to its former temperature.

The same plan of treatment has been pursued with success, even after many symptoms of gangrene had appeared, in consequence of the imprudent application of heat. It should therefore by no means be neglected, where it can be made use of sufficiently early, to give any prospect of a fortunate event.

The distressing sensations which are experienced when we suddenly expose the hands or feet to the fire, after being much chilled by cold, strongly indicate the necessity of the cautious application of stimuli. The increased sensibility to heat which is acquired by exposure to cold, did not escape the notice of the great Father of Medicine. "Those," says he, "who after journeying through snow, or any other great cold, are very much chilled either in their feet, or their hands, or their head, suffer greatly at night, when they are covered up warm, from a burning and tingling; and some are even affected with blisters, as if they were burnt by fire."*

Those disagreeable affections of the extremities, which are called chilblains, are universally owing to this cause, and are cured with equal readiness by the judicious application of cold water.

The symptoms attending the extinction of life from cold, seem in many cases to resemble Apoplexy. The drowsiness which comes on, is probably the effect of a turgescence of the head; the blood being accumulated there, by the contraction of the extreme vessels, and ~~probably~~ in some instances extravasated. This is rendered probable, by

perhaps

* Hippocrates de veteri Medicinâ, Sect. 29.

by attending to the effects produced upon those who neglect the immersion of the head when in a cold bath: this neglect often produces acute head-achs, and bleeding at the nose.

In this imperfect sketch of the phenomena of cold, the following curious fact, related by Dr. Whytt, in his Treatise on Nervous Diseases, has certainly a claim for insertion. The subject of it was a girl of eight years of age, whose system had become irritable to an extraordinary degree. "It was remarkable in this patient, that the application of cold to any part of the body, immediately brought on a fit of coughing, whether in a horizontal position in bed, or in a standing, or sitting posture. Nay, when the cough was stopped by the anodyne powers of the pediluvium, and whilst her legs continued to be immersed in it, if a bottle of cold water was applied to any part of her body, or her hands immersed in cold water, the cough was renewed, but ceased in a short time, after removing the bottle or cold water from her hands, if her feet remained covered with the warm water." Not having Dr. Whytt's ingenious Treatise at hand, I have made the above quotation from the account of the case given in Dr. Gardiner's Observations on the Animal Economy.

Two other circumstances appear necessary to be noticed in the first part of this Essay, in order to render this little history of the Effects of Cold, less incomplete. These are the effects of taking cold liquors when the body is heated, and the effects of those luxuries which grace our tables under the name of ices.

That the use of cold liquors when the body is warm, is attended with morbid, and sometimes mortal effects, is unhappily a fact of too frequent experience.

experience. Accidents from this cause often occur in the streets of Philadelphia, during the burning heats of summer. Dr. Rush has mentioned three circumstances as generally concurring, in his Essay upon this subject.* 1. That the patient is extremely warm. 2. That the water is extremely cold. And 3. A large quantity of it is suddenly taken into the body. "The danger," he observes, "is always in proportion to the degrees of combination which occur in these three circumstances."

For the history of the symptoms, which follow the use of cold water, under the circumstances already mentioned, I shall again quote the above treatise, as the description is equally accurate and comprehensive. "In a few minutes," says our author, "after the patient has swallowed the water, he is affected by a dimness of sight, he staggers in attempting to walk, and unless supported falls to the ground; he breathes with difficulty; a rattling is heard in his throat; his nostrils and cheeks contract and expand with every act of respiration; his face appears suffused with blood, and of a livid colour; his extremities become cold, and his pulse imperceptible; and unless relief is speedily obtained, the disorder terminates in death, in four or five minutes."

"This description includes only the less common cases, of the effects of drinking a *large* quantity of *cold* water, when the body is *preternaturally* heated. More frequently patients are seized with acute spasms in the breast and stomach. These spasms are so painful, as to produce syncope and even asphyxia."

The cure of this disease consists in giving laudanum, in doses proportioned to its violence.
And

* Inquiries, Vol. 1st, p. 181.

And in cases where the vital functions appear to be suspended, the remedies used to recover persons apparently drowned, may be employed with advantage.

Tiffot observes, that a pleurisy, so violent as to destroy life in a few hours, is sometimes produced by drinking cold water when the body is much heated.

The *external* application of cold water to the body in these circumstances, is also attended with considerable danger. Dr. Michael Rosa, an Italian Physician of much celebrity,* has recorded a very interesting case of a young lady, who, in the evening of the first of May, which had proved unusually warm, bathed almost the whole of her body, with some water which had been exposed in a bowl for some time to the rays of the sun. The particulars of the case are too long to be mentioned here, but the following are the principal facts. Notwithstanding the coldness of the water was much diminished by the precaution above related, the use of it, was followed in about six days by an acute pain of the head, succeeded by a fore-throat and high fever; which, though it sometimes apparently left her, returned at intervals for many months. Nor was she entirely freed from the consequences of her imprudence, till the following summer.

All the injurious effects which have been enumerated as attending the use of cold liquors, when the body is heated, may naturally be supposed to follow the use of ices. Every caution, therefore, which the contemplation of these effects may render necessary with regard to the former, must apply with peculiar force to the latter. They are most gratifying, when the body has been

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* Osservazioni sopra alcune Malattie particolari, p. 102.

exposed to the heat of a crowded room, and are often most injudiciously introduced as a refreshment, after the heat and fatigue occasioned by dancing. That under these circumstances they should prove detrimental to the system, might naturally be expected. But even when the body is perfectly cool, the effects of the introduction of aliment so much below the temperature of the body, may be highly noxious. Dr. Haller informs us, that the cold water which he drank whilst crossing the Alps, which is entirely furnished by the solution of those immense masses of ice which cover their summits, produced a pain in his breast resembling pleurisy.

Dr. Rush relates in his Lectures, the case of a Major in the American army, who, from imprudently eating a quantity of ice-cream, was afflicted with a scirrhus in the stomach, which terminated fatally, at the distance of twelve months.

The late General Wayne was attacked by a disease so acute as to threaten his life, in the year 1792, from imprudently taking a large draught of iced punch.

The suppression of the menstrual discharge has also been enumerated amongst the effects produced by the use of ices.*

With these facts, I conclude this imperfect history of the general Effects of Cold upon the System in Health, and shall now proceed to inquire into the facts of its Operation in a Morbid State, the consideration of which was allotted for the second part of this Essay.

* Tissot, p. 357.

SECOND PART.

IT will be necessary before we can lay down any rules for the use of cold as a remedy in certain diseases, to inquire to what class it belongs, as our practice will otherwise be uncertain and inefficacious. Much contradiction has arisen from the various and contradictory effects which have been ascribed to cold. By some practical writers it has been classed amongst Sedative, by others amongst Tonic remedies, and as such recommended in cases of debility. The illustrious Cullen, to whose acute and penetrating genius, the medical world is under so many and such great obligations, in his general view of the Cure of Fever, has assigned a place to cold as a remedy, under two classes of so different a nature, that were its effects so opposite, great uncertainty must necessarily arise in its use. Under the head of those remedies which moderate the violence of reaction, he places cold as a sedative. Amongst those which remove the causes, or obviate the effects of debility, by supporting and encreasing the action of the heart and arteries, he classes it as a tonic. From the facts above quoted, we may, however, (I think) conclude, that the operation of cold upon the arterial system is directly the reverse, unless in cases of great indirect debility. And even in such cases it may perhaps be questioned, whether, when disease has been so violent as to prostrate the strength of the arterial system from excessive action, the use of cold, unless combined with other remedies

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more powerfully debilitating, would be found sufficient to remove that oppression, and thus excite the vessels into freer and more powerful action.

It may be asked, whence is it that when the body is debilitated by the heat of summer, cold-bathing so speedily restores strength. This must be explained in the same way. The various powers assigned to cold, arise from a proper distinction not having been made, between direct and indirect debility. In cases of the former kind, the application of cold must almost uniformly be injurious, whereas the use of it in the latter, by lowering the excess of action, which is its cause, may restore the system to its regular and healthy state.

The effects of cold in the latter state of debility, are happily illustrated by Dr. Browne in his *Elements of Medicine*.* “If,” says he, “cold sometimes seems to stimulate, it produces that effect, not as actual cold, but either by diminishing excessive heat, and reducing it to its proper stimulant temperature, or by accumulating the excitability diminished by excessive stimulus, and communicating energy to the stimulus of the exciting powers, now acting too languidly. An instance of this operation of cold occurs in the Torrid Zone, where actual cold is scarcely to be procured, and in the use of refrigerants, as they are called, in fevers.”

To the authority of Dr. Browne, that of Dr. Rush may here be added. He has classed cold amongst those remedies, “which lessen, by the abstraction of stimulus, the morbid and excessive action of the blood-vessels.”†

From

* Vol. 1st, Sect. 37.

† *Inquiries*, Vol. 4th, p. 183.

From these observations therefore, and from the facts mentioned in the former part of this Essay, I am led to believe that cold is strictly a sedative remedy, and that all its apparent tonic effects are produced indirectly. Its sedative effects appear from its diminishing the action of the heart and arteries, from the paleness of the skin which follows its first application, from the debility and inactivity observed in the inhabitants of cold countries, and from the long application of it gradually diminishing the vital powers, till it extinguishes them entirely, either in particular parts or in the whole body. When we contemplate the nature of the diseases in which it has been used, and the effects which it has produced, this opinion will perhaps receive additional confirmation.

Cold may be applied as a remedy, under three forms, air, water, and ice or snow. There may exist degrees of morbid action so violent as to require the combined operation of all these forms, as there may exist others so moderate, as to render the use of one only necessary.

The use of cold as a remedy in certain diseases, has had to struggle with much opposition. The admission of atmospheric air, even in warm weather, was at one period cruelly denied in fevers, but a more rational mode of practice obtains now, almost universally.

Dr. Cullen himself, appears to have been at times under considerable doubts with regard to the beneficial effects of cold. After mentioning some cases, in which much advantage has been said to follow its use, he thus expresses himself: "What is the mode of its operation, to what circumstances of fever it is particularly adapted, or what limitations it requires, I shall not venture to determine,

mine, till more particularly instructed by further experience."*

In another part of the same work, however, he expresses himself with more confidence, and declares, that cold water taken into the stomach, may prove an useful tonic in fevers.† The explanation of the mode in which cold is in these cases erroneously imagined to exert a tonic power, has already been attempted.

Mr. Aitken, of Edinburgh, in his *Elementary Treatise upon Medicine*, proposes some very rational ideas upon this subject. "The application of water of low temperature," he observes, "to the cutaneous surface of the body, or the use of the cold bath, as a refrigerant remedy during fever, might be justified upon the same principle as that of other cold applications with a view to produce the like effect."‡

Modern practitioners have carried the use of cold as a remedy, to an extent scarcely contemplated in idea by their predecessors, and with the happiest effects. The history of these will constitute the remaining part of this Essay.

If what has been already observed of the operation of Cold, be admitted as just, we should naturally be led to infer, that its beneficial effects must be confined to diseases of great morbid action. Agreeably to this opinion, we shall find that the use of it may be proportioned in its extent to the degree of morbid action present in the system, and that it is injurious in those diseases where this is feeble, as in the typhus state of fever.

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* First Lines, Sect. 133.

† First Lines, Sect. 206.

‡ Aitken's Elements, Vol. 1st, p. 394.

In order to give a methodical display of the diseases in which cold has been applied, I shall adopt, in part, the arrangement laid down by Dr. Rush, in the fourth volume of his *Inquiries*, and shall therefore begin with the use of it in the various diseases classed by him under the head of the Malignant State of Fever.

This state of fever the Doctor supposes to constitute the highest grade of inflammatory diathesis. He includes under it, the Plague, the Yellow-Fever, the Gout, and the Small-Pox. To these he has lately added the Hydrophobia, which he has proved from its cause, symptoms and mode of cure, to be simply a malignant state of fever.* As, however, the gout and small-pox will occur hereafter under another head, I shall for the present confine my attention to the ~~two first and the last~~ of this state of fever, and shall therefore give a brief sketch of the use of cold in the cure of the plague.

other classes

This disease is happily but little known in the more enlightened parts of Europe. Its history is therefore in some degree imperfect; but it appears to be a disease of a highly inflammatory nature. Of the propriety of the free admission of cool air most writers upon the subject appear to be convinced. There are some facts upon record of its intentional, and others of its accidental cure by cold water. Bruce informs us in his *Travels*, that the inhabitants of the island of Massuah cure the malignant fevers to which they are subject, by keeping the patient as it were in a perpetual bath of cold water.

Dr. Rush relates in his *Lectures*, the case of a man ill of the plague, who was travelling to Aleppo. The inhabitants denied him lodging for fear of infection; he was therefore obliged to pass

* *Lectures* in 1797.

pass the night in the open air. In this situation the falling of a violent shower of rain completely wetted him, and in the morning he was perfectly cured.

Dr. Henderson, in his observations on the plague, observes, that "the use of cold water, or even water in which ice has been dissolved, will probably be of advantage in warm seasons, or when there is a tendency to an encreased secretion of bile."

In another part of his work, he informs us that "the plague is said to have been cured, by exposing the patient to the dew and rain, and by throwing salt water over the body."

The wealthy inhabitants of Smyrna preserve themselves in health by wetting their houses, whilst the plague is destroying thousands of their less opulent or provident neighbours.* The water-carriers in Aleppo, who are in a constant state of humidity, escape the plague.

Even the dews which fall in Egypt about midsummer, are sometimes so plentiful, as to destroy this distemper entirely.†

From these facts, and from the analogy which appears to exist between this disease and the yellow-fever, which is so ably traced by Dr. Rush;‡ it is probable that ice might be used here with advantages equal to those which have been derived from it in the yellow-fever, the next subject of our inquiry.

Amidst the various and contradictory opinions entertained by different practitioners with regard to the origin and treatment of the yellow-fever, which

* Rush's Inquiries, Vol. 4, p. 61.

† Memoirs of Baron de Tott, Part 4, p. 69.

‡ Rush on the Yellow-Fever, 2d edit. p. 169.

which afflicted the city of Philadelphia in the year 1793, it may be observed, that all agreed in recommending the use of cold water and cool air. Their efficacy was proved in a remarkable manner, by the sudden check given to the ravages of the disease by cold weather and heavy rains. The author of a letter published by Dr. Rush in his account of this fever,* observes, that " he places the greatest dependance, for the cure of the disease, on throwing cold water twice a day over the naked body. The patient is to be placed in a large empty tub, and two buckets full of water, of the temperature of about 75 or 80 degrees of Fahrenheit's thermometer, according to the state of the atmosphere, are to be thrown over him. He is then to be wiped dry and put to bed. It is commonly followed by an easy perspiration, and is always attended with great refreshment to the patient. This remedy, however, must be applied from the earliest attack of the disease, and continued regularly through the whole course of it."

In the postscript to this letter the author remarks, that " the practice of applying the cold bath in fevers is not new. In a malignant fever which prevailed at Breslaw in Silesia, and proved extremely fatal, yielding to none of the usual remedies, Dr. De Haehn, a physician of the place, had recourse to this remedy, and found it effectual. It has also been used with advantage in England in putrid fevers. In many of the West-India islands it is generally used in their malignant fevers. Dr. Stevens, a gentleman of high character in his profession, who is now in this city, assures me that in the island of St. Croix, where he has practised medicine for many years, it has been found more effectual than any method heretofore practised."

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* Rush on the Yellow Fever, 2d edit. p. 209.

Whatever benefits, however, may have been derived from the temporary application of cold water, much greater and more permanent advantages have followed the long continued use of it. Indeed an application so sudden as that above described, appears rather an ambiguous remedy, as it must accumulate the excitability of the system, with regard to the stimulus of heat. For this opinion, I have the authority of Dr. Browne, who remarks, that "heat is always hurtful in sthenic diseases, but still more so after a previous application of cold."*

In another part of his work he thus expresses himself. "In a particular manner, after the application of cold in an intense degree, must the application of heat be avoided, because its operation, from the increase of the excitability by cold, becomes more effective."

"Cold is the beneficial degree of temperature in the cure of this diathesis, but it must be cold not followed by any considerable degree of heat. That mistake, therefore, in medical practice, of thinking cold hurtful in sthenic diathesis by a stimulant operation, should be corrected; and its benefit in the small-pox is not to be understood to arrive so much from its mere debilitating degree, as from avoiding the stimulus of heat after its operation."†

Dr. Wistar, in a letter giving the history of an attack of the disease which he had himself encountered, gives a strong testimony from his own experience, of the efficacy of cool air, in abating the excessive action of the arterial system.‡

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* Elements of Medicine, Vol. 2d, p. 2.

† Elements of Medicine, Vol. 1st, p. 289.

‡ Rush on the Yellow Fever, 2d edit. p. 235.

Dr. Rush pursued the use of these remedies to a much greater extent. "Cold water," says he, "was a most agreeable and powerful remedy in this disorder. I directed it to be applied by means of napkins to the head, and to be injected into the bowels by way of glyster. It gave the same ease to both, when in pain, that opium gives in pain from other causes. I likewise advised the washing of the face and hands, and sometimes the feet, with cold water, and always with advantage."*

The use of cold water applied by means of napkins to the head, is not unknown to those who indulge in an intemperate use of wine, as after an evening of excess it is frequently made use of by them, in order to prevent the fever which would otherwise be the consequence of the debauch the next morning.

In the yellow-fever of 1794, Dr. Rush used the same remedies, with effects equally happy, and pursued them to equal if not greater extent. To relieve violent pain in the bowels, he applied cloths dipt in cold water to the lower part of the belly. He applied them also for three successive days and nights, to the head of one of his female patients, during an inflammation of her brain, which succeeded her fever. During this period, they were changed for the greater part of the time every ten or fifteen minutes. In 1795, he encreased the coldness of pump-water by dissolving ice in it, and in some cases applied powdered ice in a bladder to the head, with great advantage.†

It may not here be improper to add some facts of the modes in which he has used cold, in this state of fever, as detailed in his Lectures.

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* Rush on the Yellow Fever, 2d edit. p. 287.

† Inquiries, Vol. 4th, p. 91.

He does not conceive it necessary to wash the whole of the body with cold water: local application to the parts particularly affected with pain, or to the head when the disease has a determination thither, will in general be sufficient.

Ice, he observes, was used many years ago in the cure of Influenza. There are various modes of using it; the most convenient appears to be that already mentioned, as when included in a bladder it may be put into bed with the patient, and applied to any part where it is necessary.

On the internal use of cold liquors in this disease, Dr. Moseley observes,* that Galen cured all his patients, after the first stage of it, with cold water; and goes so far as to say, he never lost one, where cold water was given in a proper manner."

He appears, however, to be dubious himself, with regard to administering cold water internally. He asserts that "cold water is improper in the beginning of the disease, and it is too rapid in its termination, to admit of any delay, or interval, that is not filled up with medicine. Nor can it be given at the same time that the patient is under the operation of cathartics."† The experiments of Dr. Rush seem to lead to a contrary opinion.

state

In hydrophobia, which constitutes one of the highest grades of this ~~kind~~ of fever, Dr. Rush recommends that the various debilitating remedies should be used with equal freedom as in the yellow-fever. The free admission of cold applications, is consequently included.

The use of cold water in this disease has the sanction of high antiquity. Celsus recommends that the patient should be suddenly thrown into a pond, and if he cannot swim, that he be left there

* Moseley on Tropical Diseases, 5d edit. p. 440.

† Moseley, p. 441.

there till he be almost drowned. Sometimes raising him to the surface, at others keeping him under, and thus compelling him to swallow a quantity of cold water.*

Some facts of the operation of cold water in this disease, may be seen in Southwell's Medical Essays.† Amongst others, he gives us the history of a case, which was delivered to the Academy of Sciences. The patient was tied to a tree, and while in this situation had two hundred buckets of water poured upon him: he recovered without any other assistance.

In Italy large quantities of cold water are still given in fevers, after the manner of the ancients, with a view to procure vomiting and sweating.‡

This is also said to be a part of the practice of the Spanish physicians, and is called the *Diæta Aquæ*.§

"I am persuaded," says Brydone, "that in skilful hands, few remedies would be more effectual in many of our stomach and inflammatory complaints, than a free use of iced liquors; as hardly any thing has a stronger or more immediate effect upon the frame; and surely our administering of warm drinks and potions in these complaints, tends often to nourish the disease. It is the common practice in Sicily, to give quantities of ice-water to drink in inflammatory fevers; nay, so far have they carried it, that Dr. Sanghes, a celebrated Sicilian physician, covered the breast and belly of his patients with snow or ice; and they assure us, in many cases with great success."||

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* Celsus, Lib. 5, Cap. 27, § 2.

† Vol. 2, p. 94.

‡ Moseley, p. 441.

§ Cullen's First Lines, Sect. 157.

|| Tour through Sicily, &c. Amer. edit. p. 323.

Among the objections which have been made to the external application of cold water and ice, that which forbids their use whilst the system is under the action of mercury, appears to have had some influence upon many. The effect said to be produced by cold under these circumstances, is that it causes the mercury to fall upon the mouth. This however is very beneficial in this state of fever. That this effect is produced by cold,* is denied by John Hunter, nor indeed does he suppose that any injurious consequences follow exposure to cold, whilst a patient is taking mercury in any form. Dr. Rush uses cold applications of all kinds, with the greatest freedom, whilst he is administering large doses of calomel, nor has this practice been attended with any unfavorable effects.†

Having spoken thus largely of the application of cold in this state of fever, it will not be necessary to be equally minute in those states which remain to be considered. On these, therefore, I shall say as little as possible, premising only, that the use of this remedy, like every other, must be regulated by the violence of the inflammatory symptoms, for the removal of which it is applied.

Of the gangrenous state of fever, much need not be said. This epithet is adopted by Dr. Rush in the room of putrid, which he rejects entirely. He supposes that this state of fever, is nothing more

* Hunter on the Lues, London edit. p. 339—349.

† As an additional proof that cold applications are not forbidden by the use of mercury, I will here observe, that a fellow-student in this University, informs me, that he has often applied pounded ice to venereal buboes, in order to prevent suppuration, with the happiest effects; although the patient was at the same time using mercury both internally and externally.

more than the issue of a violent inflammation left in the hands of nature, or accelerated by stimulating medicines. Here therefore the use of cold is strongly indicated.

Some confusion appears to have arisen in medical writings, from giving to this state of fever, the name of Typhus. When we read of the beneficial effects, derived from washing the body in cold water and vinegar in Typhus fever, we can scarcely suppose that this appellation refers to that state, in which the arterial system labours under *direct* debility; but must rather refer to that in which the debility is of the *indirect* kind.

Omitting several intermediate states of fever, described by Dr. Rush, which, as, with the exception of the Typhus, they all partake more or less of the inflammatory diathesis, require the application of cold in a degree proportioned to their respective violence, I proceed next to the Intestinal State of Fever, or Febris Introverſa of Dr. Sydenham, under which class are comprehended Cholera Mobus, Diarrhœa, Dysentery, and Colic.

In this class of diseases the cutaneous surface of the body seems to be peculiarly affected. Hence blisters are so universally recommended by practical writers. The external application of cold therefore may be presumed to be beneficial, if it have been proved to be useful in what may be called the primary states of fevers of this class.

Cholera morbus being the fever of the highest grade, would, it should seem, require the freest use of cold, but I have not yet met with any facts of its operation.

In the Cholera Infantum, Dr. Rush observes, that " he has had but few opportunities of trying the effects of cold water applied to the body; but
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from the benefit which attended its use in the cases in which it was prescribed, he is disposed to believe that it would do great service, if the prejudices which subsist in the minds of parents against it, could be overcome.*

Diarrhœa, as a milder grade, would require remedies proportioned. In the diarrhœa of infants, Dr. Darwin recommends exposure of the body to the cold air.

In dysentery, glysters of cold water, and even of water in which ice has been dissolved, have been administered with the happiest effects. Dr. Rosa, whom I have already quoted, exhibited glysters of cold spring-water, to an Italian gentleman who laboured under a most violent dysentery, attended with the most excruciating pain. An immediate relief was obtained, but such a chill was given to the body of the patient, that his teeth chattered with the cold. After enduring this application for a little time, he became impatient, and refused to have it administered for two days, in consequence of which his complaint returned with redoubled violence, but again left him upon the renewal of the cold glysters, and upon persisting in their use, a speedy cure was obtained.†

In colic, Dr. Rush informs me, that he has given glysters of cold-water, with immediate relief. One of his patients in particular, who is often afflicted with it, has derived such benefit from their use, that she uses an injection of this kind, whenever she has an attack of the disease. Dr. Cullen observes, that when every purgative has failed in this disease, the action of the intestines

* *Inquiries*, Vol. 1st, p. 166.

† *Osservazioni*, &c. p. 133.

testines has been effectually excited by throwing cold water on the lower extremities.*

The Pulmonary State of Fever is next to be considered; under which are included True and Bastard Pneumony in their acute forms, Catarrh from Cold or Contagion, and Chronic Pneumony or Pulmonary Consumption.

In the true pneumony, all writers agree upon the propriety of a cool regimen. Upon this point, Sydenham, Cullen and Browne, however opposed in general, unite their suffrages. The latter particularly inculcates its importance, and extends its use to the false pneumony also. Dr. Cullen, however, recommends cold to be guarded against in the treatment of this last disease.

For the cure of catarrh, Dr. Browne repeatedly asserts in various parts of his work, that the simple application of cold is insufficient. The use of ice in the influenza, or that species of catarrh which proceeds from contagion, has been already hinted at.

In pulmonary consumption, Dr. Rush informs us in his Lectures. that he has used the cold bath with great success. In his treatise upon this subject, he observes that " he has repeatedly prescribed walking in a cold air, in the inflammatory stage of consumption, with advantage, and has often had the pleasure of finding a single walk of two or three miles, in a clear cold day, produce nearly the same diminution of the force and frequency of the pulse, as the loss of six or eight ounces of blood."† Brydone assures us, that " he knew an English lady at Nice, who was cured in

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* First Lines, Sect. 1448.

† Inquiries, Vol. 2d, p. 125.

a short time of a very threatening consumption, only by a free indulgence in the use of ices."*

We now come to the Anginose State of Fever, which includes all those morbid affections classed by Dr. Cullen under the head of Cynanche. If this state of fever be strictly inflammatory, if the cynanche maligna be only the consequence of a high degree of cynanche inflammatoria, analogous to the production of the gangrenous state of fever from violent inflammation, is there not an error in the present mode of treating this class of diseases? Should not the throat rather be exposed to the cold air than protected from it, or might not even cold water be applied with advantage?

In the tonic species of the rheumatic and arthritic states of fever, cold air, and in some instances cold water, has been applied with the happiest effects to the inflamed limb. The use of flannel and warm applications, has been generally recommended in cases of this kind. If the relief experienced from the contrary plan of treatment, should prove that they have been recommended without sufficient reason, may not the warm regimen adopted in the treatment of cynanche, perhaps be discovered to be equally erroneous?

In the Maniacal State of Fever, the free application of cold, is pretty generally admitted. Dr. Cullen observes that "maniacs have often been relieved, and sometimes entirely cured, by the use of cold-bathing, especially when administered in a certain manner. This seems to consist in throwing the madman into cold water by surprise; by detaining him in it for some length of time; and pouring water frequently upon the head, while the whole of the body except the head is immersed in

* Tour through Sicily, &c. p. 323.

in the water; and thus managing the whole process, so as that with the assistance of some fear, a refrigerant effect may be produced. This I can affirm, has been often useful; and that the external application of cold may be of service, we know further from the benefit which has been received, in some maniacal cases, from the application of ice and snow to the bare head, and from the application of the clay-cap."*

Dr. Browne^y maintains the same opinion, and advises that the patient should be immersed in water as cold as possible, and kept under it, covered all over for a long time, till he is almost killed. Perhaps however every effect desired, might be produced without keeping the head of the patient under water, and thus endangering suffocation, by constant applications of pounded ice or snow to the head, as this will be sufficient to prevent the determination of the blood thither, which might otherwise be the result of a partial immersion.

Dr. Rush relates in his Lectures, the case of a maniac who made his escape from his friends, and slept all night in the open air. The sudden chill so much reduced the morbid excitement, that in a few days his reason was restored.

In the Apoplectic State of Fever, cold air and cold applications to the head, have been much recommended. "One of the most effectual methods of rousing apoplectics," says Dr. Cullen, "seems to be throwing cold water on several parts of the body, or washing the body all over with it."†

In the Hydrocephalic State of Fever, Dr. Rush applied vinegar, in which ice had been dissolved, to the head, with evident advantage. He found
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* First Lines, Sect. 1570.

† First Lines, Sect. 1131—1139.

that linen cloths, wetted with cold vinegar or water, and applied to the forehead, contributed very much to relieve the acute pain in the head which generally accompanies this disease.*

If the Hydropical State of Fever, be an inflammatory disease accompanied with watery effusion, it might be expected that cold would produce beneficial effects in it. Dr. Monroe notices the efficacy of travelling in cold weather in this disorder. It should seem that the cold here operates as a sedative, and co-operates with the fatigue produced by labour or exercise, in reducing the tone of the arterial system.†

Since an encreased secretion of urine is the consequence of the application of cold to the cutaneous surface of the body, might it not be advantageously used with that indication in this disease? It is not uncommon to take children affected with a temporary ischuria, out of bed, and place them upon a cold stone or marble hearth, which generally at once removes the obstruction.

Dr. Sydenham was accustomed to make his patients in the small-pox, rise from their beds and remain for some time in the cool air, when they were labouring under a symptomatic ischuria. After a short time the urine flowed freely.‡

An observation of Dr. Darwin, in his chapter upon the retrograde absorbents, may afford additional ground for this practice. When the body is suddenly exposed to cold air, or sprinkled with cold water, he supposes that the lymphatics of the bladder and intestines, invert their motions, and
return

* *Inquiries*, Vol. 2d, p. 219—227.

† *Inquiries*, Vol. 2d, p. 177.

‡ Wallis's *Sydenham*, Vol. 1st, p. 197.

return the fluids which were previously absorbed, into the intestines and bladder.*

The Eruptive State of Fever, comprehends the Small-Pox, Measles, and the other Exanthemata of Dr. Cullen. The use of cold, in the first class of diseases, is now well established; perhaps however, the cold regimen might be pursued with advantage to a greater extent than it has hitherto been. The following fact gives countenance to this opinion. Twelve or fourteen children, belonging to some soldiers, in a regiment which was marching from Glasgow to the Highlands, were seized on the road with the small-pox. The weather turned out remarkably cold, with a constant rain during the march, and the children being carried on horseback in open panniers, with little more than a single blanket to defend them from the cold and rain; the surgeon of the regiment was under some apprehension of bad consequences from a situation so much exposed. His fears, however, were ill-founded, for all the children had a mild and distinct sort, more like the inoculated than the natural small-pox, and they soon recovered.†

It does not appear sufficiently obvious, why the measles should not be treated in the same manner as the small-pox. Fears have been entertained that the application of cold, to use the common phrase, causes the measles to strike in; but Dr. Browne strenuously denies that such an effect is ever produced, and enters fully into a vindication of a cold regimen in this disease.‡

Dr. Cullen has an observation which seems to confirm this idea. "It has been an unhappy opinion,"

* Zoonomia, Vol. 1st, Sect. 29. 4.

† Gardiner on the Animal Economy, p. 206.

‡ Elements of Medicine, Vol. 2d, Sect. 446.

opinion," says he, "with most physicians, that eruptive diseases were ready to be hurt by cold; and that it was therefore necessary to cover up the body very closely, so as thereby to encrease the external heat. We now know that this is a mistaken opinion; that encreasing the external heat of the body is very generally mischievous; and that several eruptions not only admit, but require the application of cold air."*

In the Hæmorrhagic State of Fever, daily experience establishes the utility of cold applications.

Cold liquors and cold air have produced the most beneficial effects in Hæmoptysis, and cold water applied to the scrotum, has checked the most violent and distressing cases of it.

In Epistaxis the same remedies have been applied with equal advantage. Cold applications to the neck have been particularly serviceable.

In Hæmorrhagia Uterina, whether occurring in a state of pregnancy or otherwise, as also in cases of it succeeding parturition, cold has been successfully applied in a great variety of forms.

Cold water has been successfully injected into the uterus by Dr. Gordon of Copenhagen, in several cases of profuse flooding.

Levet introduced a bit of ice into the uterus with the same indication, and with equal success.†

In the Hæmorrhoidal State of Fever, great relief has been obtained from repeated applications of cold water to the part affected.

The Spasmodic State of fever is the next in order, including Hooping-Cough and Tetanus.

Much advantage has been derived from exposing children, labouring under the convulsions which sometimes

* First Lines, Sect: 728.

† Vide Aitken's Elements, Vol. 1st, p. 259, 263.

sometimes accompany the small-pox and whooping-cough, to a stream of cold air.

For tetanus, the affusion of cold water is esteemed by Dr. Moseley by far the most efficacious remedy: he recommends that the patient should either be immersed for some minutes in a tub of cold water every two hours; or that he should be placed upon the floor, and from two to eight or ten pails-full of the coldest water be suddenly poured upon him. In the West-Indies, where this is unhappily a disease of frequent occurrence, this remedy obtains almost universally. A Dutch practitioner in the island of Nevis, cured one patient by laying him in wet sheets; but was obliged, for fear of the ill consequences attending a deviation from established customs, to relinquish this mode of treating the disease.*

I do not however imagine that cold water exerts any specific influence in the cure of this disease; but that all the good effects resulting from its use, may be attributed to its debilitating powers, by which it takes down morbid excitement. The wrapping the patient in sheets kept constantly wet, would appear, therefore, to be the most eligible and the most effectual mode of the application of cold.

The last state of fever which I shall here notice, is the Cutaneous, or Misplaced Fever. Under this head, Dr. Rush includes Leprosy, the Nettle-Rash, and the Prickly Heat. These misplaced states of fever require the remedies adapted to the primary disease. In the prickly heat, Dr. Moseley

* Medical Commentaries, Vol. 2, p. 112, Amer. edit. Moseley on Tropical Diseases, p. 493 and seq. Cullen's First Lines, Sect. 1280.

ley recommends that cold-bathing or cold application should be cautiously avoided, for fear of repelling it.* This fear is perhaps equally groundless with that which was long entertained of repelling the small-pox. Dr. Wade on the contrary assures us, that the cold-bath may be used with the greatest safety, in the prickly heat, and other cutaneous eruptions.†

Some facts of the operation of cold, which could not conveniently be classed under any of the foregoing heads, remain yet to be treated of. Tissot relates two remarkable instances of the good effects of the cold bath, in cases of Insolation, or as it is commonly termed, a Stroke of the Sun.

The first is, of a man, who, having been for a long time exposed to the scorching rays of the sun, became highly delirious, though without fever, and proved really mad. After repeated bleeding, he was thrown into a cold-bath. This was frequently repeated, and cold water at the same time poured upon his head. By this mode of treatment, he recovered, though very gradually.

The second is the case of an officer, who having rode post for several days successively, in very hot weather, swooned away immediately upon dismounting at the end of his journey; nor could he be recovered by the usual applications in such cases. He was cured however at last, in consequence of being plunged into a bath of freezing water. It should,

* Tropical Diseases, p. 20.

† Medical Commentaries for 1793 p. 203.

should, however, be observed, says our author, that the cold-bath should never be administered in these cases, without previous bleeding.*

In Tympanites, a disease, the cure of which has been reckoned among the *desiderata* of the healing art, Dr. Cullen observes, that "cold drink has been constantly prescribed, and cold-bathing has been employed with advantage; and there have been several instances of the disease being suddenly and entirely cured, by the repeated application of snow to the lower belly."†

A curious and anomalous case of violent and distressing head-ach, which was cured by drinking cold water, may perhaps be properly mentioned in this place. An officer in the service of the Duke of Wirtemberg, had been for some time afflicted with so severe a head-ach, that he had even submitted to the operation of the trepan in hopes of relief, though without effect. In this state he was advised to make use of a remedy very simple in its nature, but which was asserted to be infallible, provided the patient persevered in its daily use. It consisted in drinking six quarts of spring-water daily for three months. Although he had little faith in the remedy, he so soon perceived a mitigation of his complaint, that he persisted in the use of it, and within the time prescribed, was relieved from a disorder, which for eighteen months had baffled
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* Advice to the People, p. 257.

† First Lines, Sect. 1642.

every medicine, and deprived him of every enjoyment. No particular regimen was enjoined, except that excess in eating or drinking should be cautiously avoided. At the period when the history of this case was related, the patient had been free from every symptom of the disease for nearly three years.*

All the beneficial effects of cold enumerated in the preceding pages, depend upon its judicious application. I have attempted to shew that sudden applications of it may prove highly injurious, if the patient be afterwards exposed to heat. Moderate degrees of it, long and constantly applied, with a cautious avoiding of heat, are the most likely to prove efficacious.

The utility of cold applications in partial inflammation from mechanical violence, burns, &c. need not be insisted upon here. From what has been already observed of the general effects of cold in inflammatory action, their propriety will be sufficiently apparent. A more minute consideration of these effects would lead me to the history of the extensive use of cold in some surgical cases, which, if pursued, would extend this Essay to too great a length.

Here, therefore, I shall conclude this very imperfect sketch of the Effects of Cold upon the Human Body. Of its defects I am fully conscious; but from the anxiety which I should otherwise

* Medical Commentaries, Amer. edit. Vol. 8, page 499.

otherwise feel upon this account, I am much relieved by the recollection of the candour of that body, to whose inspection it is to be submitted.

FINIS.



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